

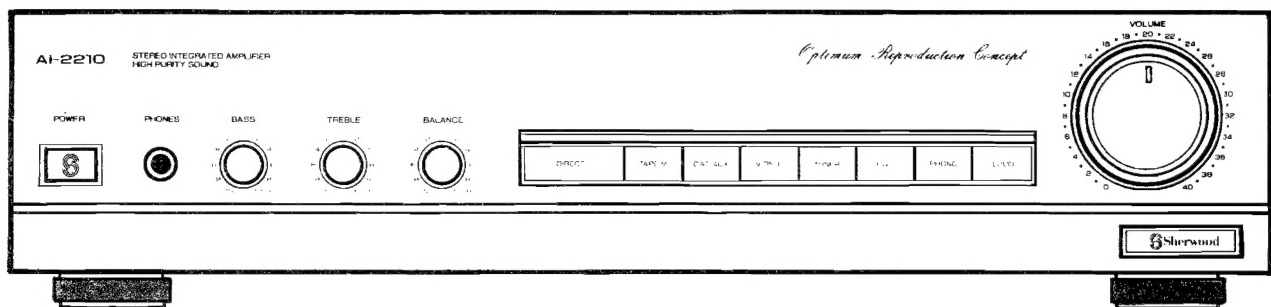
# SERVICE MANUAL

1035165

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## AI-2210

### INTEGRATED STEREO AMPLIFIER



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 **Sherwood**

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# Safety Precaution

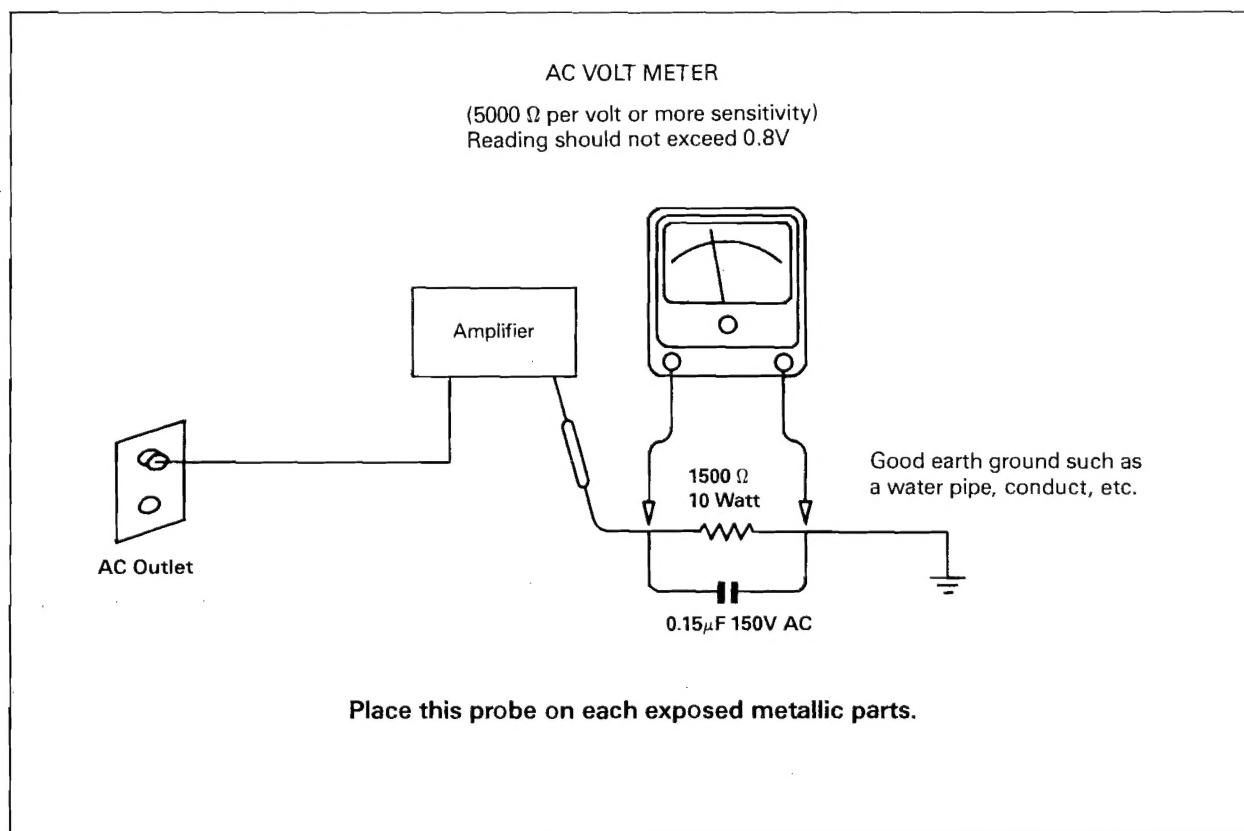
## WARNING

Service should not be attempted by anyone unfamiliar with the necessary precautions on this player. The following precautions are necessary during servicing.

1. Many electrical and mechanical parts in this player have special characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristic are identified in this manual and its supplements: electrical components having such features are identified by a  $\triangle$  in the schematic diagram and the parts list.  
Before replacing any of these components, read the parts list in this manual carefully.  
The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.
2. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as

terminals, screwheads, metal overlays, etc. to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly into a 120V AC outlet (**120V Version only**). (Do not use a line isolation transformer during this check.) Use an AC voltmeter having 5000  $\Omega$  per volt or more sensitivity in the following manner:

Connect a 1500  $\Omega$  10 watt resistor paralleled by a 0.15 $\mu$ F, 150V AC capacitor, between a known good earth ground (water pipe, conduct, etc) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500  $\Omega$  resistor and 0.15 $\mu$ F capacitor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.3volts RMS. This corresponds to 0.2mA AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



# Specifications

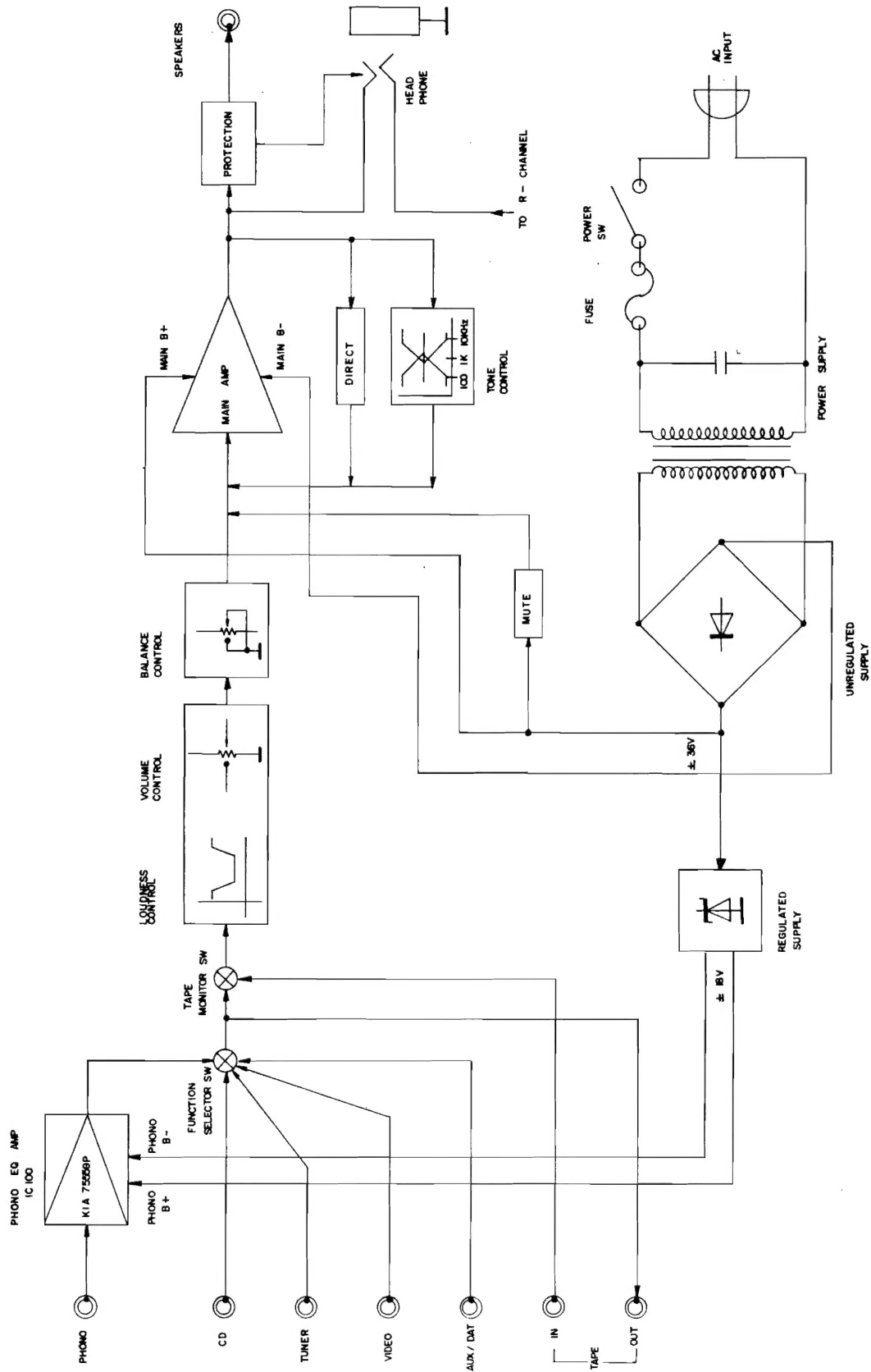
## Power output/ch.

1) Power output per channel, min.	
40Hz to 20kHz with no more than 0.3% THD, into 8 ohms . . . . .	32W
2) IEC standard output power per channel 63Hz to 12.5kHz,	
into 8 ohms . . . . .	37W
3) DIN standard output power per channel 1kHz, into 8 ohms . . . . .	39W
4) Dynamic output power, into 4 ohms . . . . .	65W
Intermodulation Distortion, 60Hz: 7kHz=4:1 SMPTE	
35W output, into 8 ohms . . . . .	0.1%
Damping Factor at 1kHz, 8 ohms . . . . .	50
Input Sensitivity for 35W output, 8 ohms at 1kHz	
Phono . . . . .	2.5mV
Aux/Tuner (CD/Video) . . . . .	93/88dB
Phono Preamp input overload at 1kHz, 0.1% THD. . . . .	180mV
at 10kHz, 0.1% THD. . . . .	600mV
Signal to noise ratio, IHF "A" wtd./unwtd.	
Phono . . . . .	70/65dB
Aux (CD/Video) . . . . .	93/88dB
Frequency Response	
Phono, RIAA 40-20,000 Hz . . . . .	± 0.5dB
Aux at 1W, -3dB . . . . .	5Hz - 45kHz
Loudness Contour	
at 100Hz . . . . .	+7dB
at 10kHz . . . . .	+3dB
Tone Control	
Bass at 100Hz . . . . .	± 9dB
Treble at 10kHz . . . . .	± 9dB
Channel Separation at Aux	
at 100Hz . . . . .	50dB
at 1kHz . . . . .	45dB
at 10kHz . . . . .	40dB
Power Consumption . . . . .	Typical 95W (min 20W, max 160W)
Power requirements;	(A): 120V 50Hz for USA/Canadian version
	(B): 120/220V 60/50Hz for multi-voltage version
	(C): 220V 50Hz for general European version
	(D): 220V 50Hz for west Germanian & Italian version
	(E): 240V 50Hz for British & Australian version
	(F): 220V 50Hz for Swiss & Scandinavian version
Dimensions . . . . .	17.3(W)×3.6(H)×9.6(D) inch
Weight (overall) . . . . .	5.5kg (12.1 lbs)

**Note:** Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the American (A) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

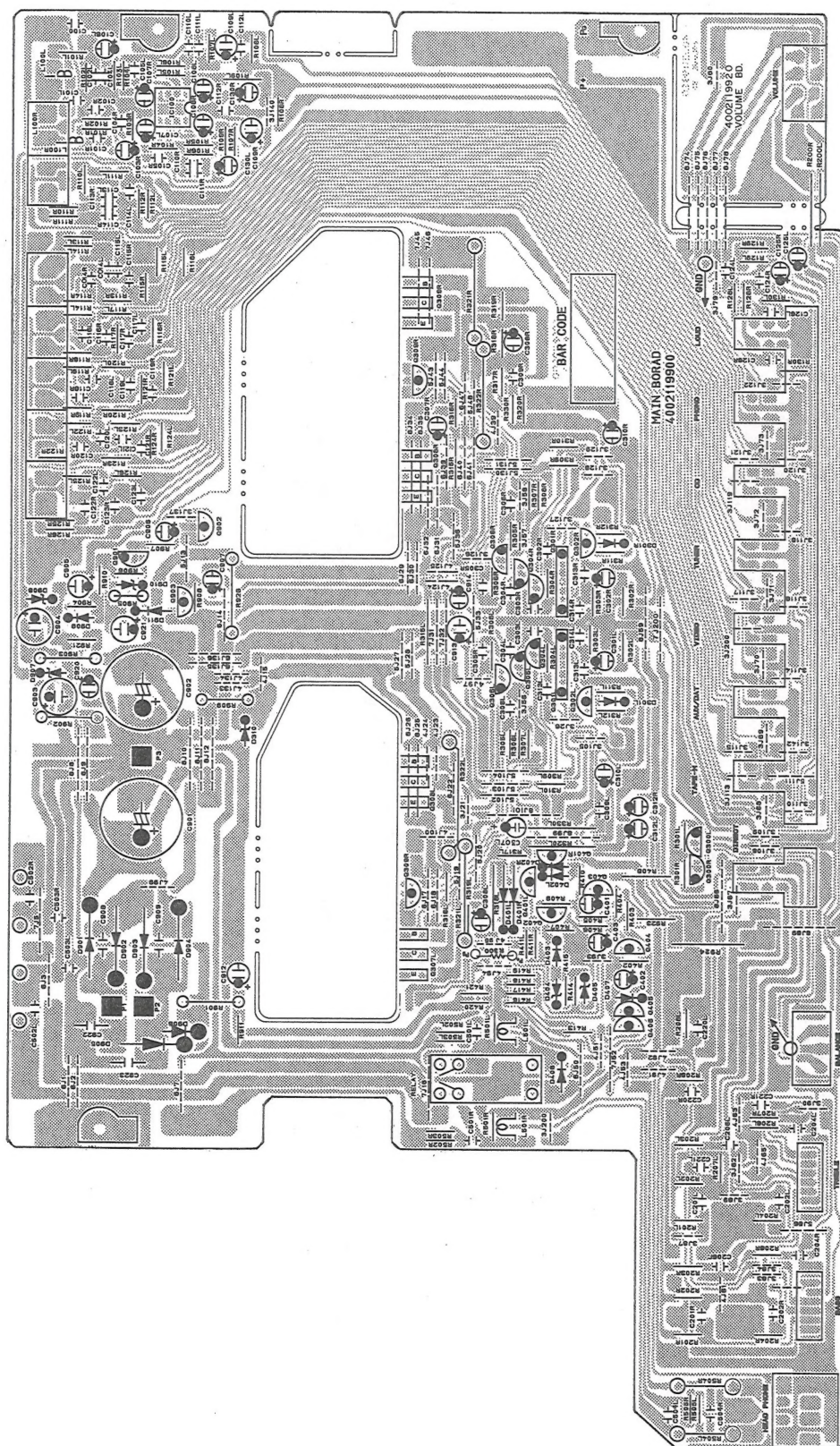
Design and Specifications subject to change without notice for improvement.

# Block Diagram



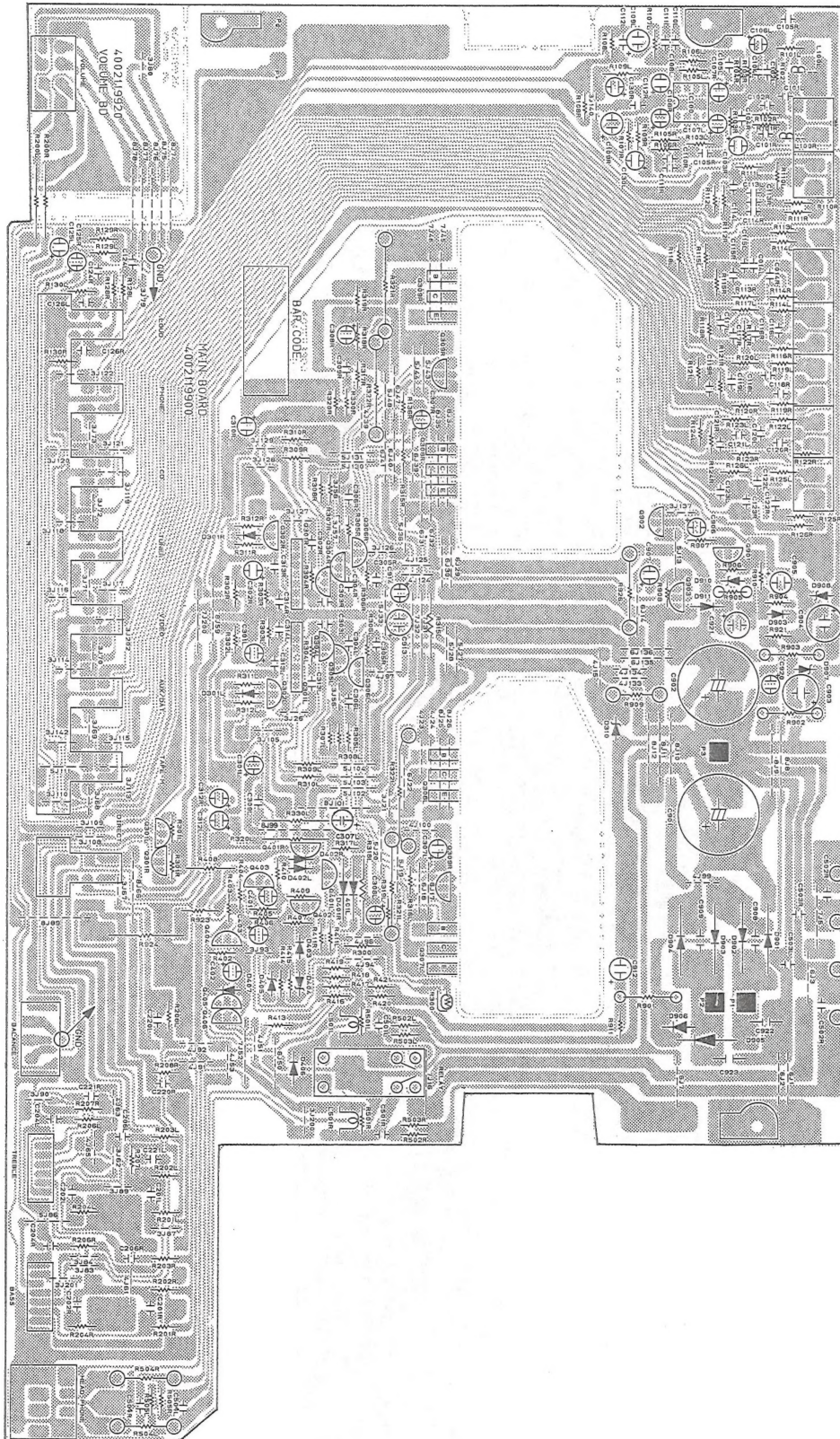


**(TOP VIEW)**

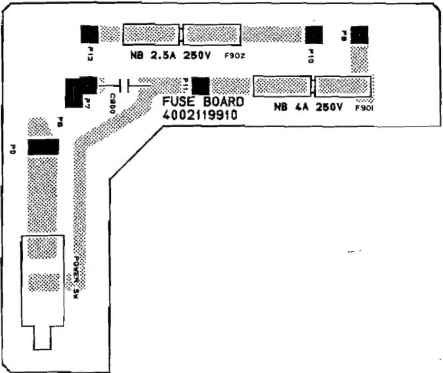




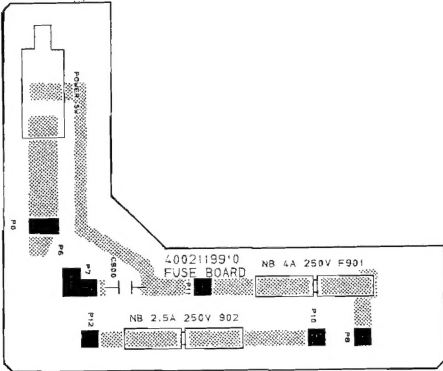
(BOTTOM VIEW)



**FUSE P.C. BOARD 4002119910**  
**(TOP VIEW)**



**(BOTTOM VIEW)**



# Electrical Parts List

PRODUCT SAFETY NOTICE: Product marked with  $\triangle$  have special characteristics important to safety. If you replacing any of these components, read carefully the product safety notice of this manual. Don't degrade the safety of the product through improper servicing. RESISTOR/CAPACITOR Tolerance, D:  $\pm 0.5\%$ , J:  $\pm 5\%$ , K:  $\pm 10\%$ , M:  $\pm 20\%$ , Z:  $+80\%$ ,  $-20\%$

Ref. No.	Description					Mfr. Part No.
P-1	PCB Ass'y-Main					059222900001
Capacitors						
C014L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C100	Ceramic	0.047 $\mu$ F	50V	Z		3579473530
C101L/R	Ceramic	22 pF	50V	D	for German only	3579220210
C102L/R	Ceramic	68 pF	50V	D		3579680130
C103L/R	Electric SA	4.7 $\mu$ F	50V	M		3479247971
C104L/R	Ceramic	10 pF	50V	D		3579100030
C105L/R	Ceramic	2200 pF	50V	Z		3579222530
C107L/R	Electric SA	10 $\mu$ F	35V	M		3479210061
C108L/R	Electric SA	47 $\mu$ F	25V	M		3479247041
C109L/R	Electric SA	0.68 $\mu$ F	50V	M		3479268871
C110L/R	Mylar	0.0018 $\mu$ F	100V	J		3679182120
C111L/R	Mylar	0.0056 $\mu$ F	100V	J		3679562120
C112L/R	Mylar	0.056	50V	D		3679562120
C113L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C114L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C115L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C116L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C117L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C118L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C119L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C120L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C122L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C123L/R	Ceramic	100 pF	50V	D	for German only	3579101130
C124L/R	Ceramic	330 pF	50V	D		3579101130
C125L/R	Electric SA	4.7 $\mu$ F	50V	M		3479247971
C126L/R	Mylar	0.1 $\mu$ F	100V	J		3679104120
C130L/R	Electric SA	0.22 $\mu$ F	50V	M		3479222871
C201L/R	Mylar	0.027 $\mu$ F	100V	J		3679273120
C202L/R	Mylar	0.1 $\mu$ F	100V	J		3609104120
C204L/R	Mylar	0.0018 $\mu$ F	100V	J		3679182120
C206L/R	Mylar	0.0047 $\mu$ F	100V	J		3679472120
C220L/R	Ceramic	3 pF	50V	J		3579309030
C221L/R	Ceramic	5 pF	50V	J		3579509030
C301L/R	Electric SA	4.7 $\mu$ F	50V	M		3479247971



Ref. No.	Description					Mfr. Part No.
C302L/R	Ceramic	820 pF	50V	J		3579821130
C303L/R	Ceramic	15 pF	50V	J		3579150130
C304L/R	Not used !					
C305L/R	Mylar	0.047 $\mu$ F	100V	J		3679473120
C306L/R	Mylar	0.047 $\mu$ F	100V	J		3679473120
C307L/R	Electric SA	22 $\mu$ F	35V	M		3479222061
C308L/R	Electric SA	4.7 $\mu$ F	35V	M		3479247971
C309L/R	Ceramic	10 pF	50V	J		3579100130
C310L/R	Electric SA	100 $\mu$ F	16V	M		3479210131
C312L/R	Electric SA	22 $\mu$ F	35V	M		3479222061
C313L/R	Ceramic	100 pF	50V	J	for German only	3579101130
C401	Electric SA	22 $\mu$ F	35V	M		3479222061
C402	Electric SA	47 $\mu$ F	10V	M		3479247021
C403	Electric SA	22 $\mu$ F	35V	M		3479222061
C501L/R	Mylar	0.047 $\mu$ F	100V	J		3679473120
C502L/R	Ceramic	2200 pF	50V	J	for German only	3579222530
C503L/R	Ceramic	2200 pF	50V	J	for German only	3579222530
C504L/R	Ceramic	560 pF	50V	J	for German only	3579561130
C901/C902	Electric SA	4700 $\mu$ F	50V	M		3419547295
C903/C904	Electric SA	100 $\mu$ F	50V	M		3409210171
C905	Electric SA	22 $\mu$ F	50V	M		3479222071
C906	Electric SA	0.1 $\mu$ F	50V	M		3479210871
C907	Electric SA	10 $\mu$ F	50V	M		3479210071
C908/C909	Electric SA	0.01 $\mu$ F	500V	M		3509103450
C910/C911	Not used!					
C912	Electric SA	220 $\mu$ F	35V	M		3409222161
C913	Electric SA	100 $\mu$ F	50V	M		3409210171
C914	Electric SA	22 $\mu$ F	50V	M		3479222071
C915-C919	Not used !					
C920	Electric SA	10 $\mu$ F	50V	M		3479210071
C921	Electric SA	47 $\mu$ F	50V	M		3409247071
C922/C923	Mylar	0.33 $\mu$ F	150V	J	for German only	3609334130
Coils						
L100L/R	Inductor 50 $\mu$ H for German only					2648001010
L501L/R	Inductor 0.5mH					2648601470
Diodes						
D111	LED KLR205E, Red					2308060102
D301L/R	1N4148					2058306101

Ref. No.	Description	Mfr. Part No.
D310	DZ15, Zener	2058599109
D401L/R	1N4148	2058306101
D402L/R	1N4148	2058306101
D403	1N4148	2058306101
D404	DZ5.6V, Zener	2058599104
D405	DZ12V, Zener	2058599116
D406	1N4002	2258106100
D407	1N4148	2058306101
D901/D902	1N5402	2058100105
D903/D904	1N5402	2058100105
D905	1N4002	2258106100
D906	1N4002	2258106100
D907/C908	DZ18V, Zener	2058599111
D909	1N4002	2258106100
D910	DZ15V	2058599109
D911	1N4002	2258106100

#### IC

IC100	KIA75559 EQ Amplifier	2168206104
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Resistors: All resistors are 1/5W carbon film  $\pm 5\%$  tolerance, unless otherwise specified. M.O is metal oxide type. C is cement type. M is metal film.

Ref. No.	Description	Mfr. Part No.	Ref. No.	Description	Mfr. Part No.
R101L/R	1k $\Omega$	3069102970	R118L/R	220k $\Omega$	3069224970
R102L/R	100k $\Omega$	3069104970	R119L/R $\triangle$	120 $\Omega$	3069121970
R103L/R	100k $\Omega$	3069104970	R120L/R	2.7k $\Omega$	3069272970
R104L/R	910k $\Omega$	3069911970	R121L/R	220k $\Omega$	3069224970
R105L/R	560k $\Omega$	3069564970	R122L/R $\triangle$	120 $\Omega$	3069121970
R106L/R	43k $\Omega$	3069433970	R123L/R	2.7k $\Omega$	3069272970
R107L/R	470k $\Omega$	3069471970	R124L/R	220k $\Omega$	3069224970
R108L/R	100k $\Omega$	3069104970	R125L/R $\triangle$	120 $\Omega$	3069121970
R109L/R	47 $\Omega$	3069470970	R126L/R	2.7k $\Omega$	3069272970
R110L/R	120 $\Omega$	3069121970	R127L/R	Not used !	.
R111L/R	2.7k $\Omega$	3069272970	R128L/R	91k $\Omega$	3069913970
R112L/R	220k $\Omega$	3069224970	R129L/R	220k $\Omega$	3069224970
R113L/R	2.7k $\Omega$	3069272970	R130L/R	5.6k $\Omega$	3069562970
R114L/R $\triangle$	120 $\Omega$	3069121970	R200L/R	1k $\Omega$	3069102970
R115L/R	220k $\Omega$	3069224970	R201L/R	15k $\Omega$	3069153970
R116L/R	2.7k $\Omega$	3069272970	R202L/R	150k $\Omega$	3069154970
R117L/R $\triangle$	120 $\Omega$	3069121970	R203L/R	1.2k $\Omega$	3069122970

Ref. No.	Description	Mfr. Part No.	Ref. No.	Description	Mfr. Part No.
R204L/R	3.3kΩ	3069332970	R407	12kΩ	3069123970
R205L/R	Not used !	.	R408	10kΩ	3069103970
R206L/R	1kΩ	3069102970	R409	1kΩ	3069102970
R207L/R	22kΩ	3069223970	R410	1kΩ	3069102970
R208L/R	120kΩ	3069124970	R411L/R	15kΩ	3069153970
R208L/R	120kΩ	3069124970	R412	Not used !	.
R301L/R	3.3kΩ	3069332970	R413	100kΩ	3069104970
R302L/R	1kΩ	3069102970	R414	4.3kΩ	3069432970
R303L/R	120kΩ	3069124970	R415	10kΩ	3069103970
R304L/R	560Ω	3069561970	R416/R417	470kΩ	3069474970
R305L/R	3.9kΩ	3069392970	R418/R419	180kΩ	3069184970
R306L/R	270Ω	3069271970	R420/R421	1.2kΩ	3069122970
R307L/R	20kΩ	3069203970	R501L/R	10Ω	3069100970
R308L/R	1.5kΩ	3069152970	R502L/R	22Ω	3069220970
R309L/R	10kΩ	3069103970	R503L/R	22Ω	3069220970
R310L/R	10Ω	3069100970	R504L/R	330Ω	3039331472
R311L/R	560Ω	3069561970	R505L/R	1kΩ	3069102970
R312L/R	620Ω	3069621970	R901	22Ω	3039220472
R313L/R-	Not used !	.	R902/R903	820Ω	3039821472
R314L/R			R904	47Ω	3069470970
R315L/R	1.5kΩ	3069152970	R905	2.7kΩ	3009272973
R316L/R	5.6kΩ	3069562970	R906	Not used !	.
R317L/R	120kΩ	3069124970	R907	220kΩ	3069224970
R318L/R	2.2kΩ	3069222970	R908	33kΩ	3069333970
R319L/R	2.2kΩ	3069222970	R909	1.2kΩ	3039122472
R320L/R	1kΩ	3069102970	R910	10kΩ	3069103970
R321L/R	0.27Ω	3059278682	R911	3kΩ	3069302970
R322L/R	0.27Ω	3059278682	R912-R920	Not used !	.
R402	220kΩ	3069224970	R921	10kΩ	3069103970
R403	470kΩ	3069474970	R922	82k	3069823970
R404	47kΩ	3069473970	R923/R924	750Ω	3069751970
R405	10kΩ	3069103970	R925	Not used !	.
R406	220kΩ	3069224970	R926	M,O 1k 2W	3039102572
Ref. No.			Description		Mfr. Part No.
Posistor					
PS1		PTH487A 01BE22			2438012100
Transistors					
Q300L/R		NPN 2SD 1302S Mute			2008610102

Ref. No.	Description	Mfr. Part No.
Q301L/R Q302L/R	PNP Dual $\mu$ PA 77HA PNP Dual MPS A06	2008613110 2008609102
Q304L/R Q305L/R Q306L/R Q307L/R Q308L/R	NPN KTC 2229Y Voltage Driver PNP KTA 817A Driver NPN 1627A Driver NPN 2SC 3853 Driver PNP 2SA 1489 Driver	2008606107 2028106106 2028406119 2028416108 2028116105
Q401L/R Q402	NPN MPS A05 NPN MPS A06	2008609101 2008609102
Q403 Q404 Q405/Q406	PNP MPS A55 Switching PNP MPS A06 Switching PNP MPS A06 Switching	2008209101 2008609102 2008609102
Q901 Q902	PNP KTA1015Y Switching NPN MPS A05 Switching	2008206105 2008610102
<b>Others</b>		
P1, P2, P3 P+ PG	Pin, Wrapping Pin, Wrapping Pin, Wrapping	4225000315 4225000315 4225000315
.	Terminal Ground	4235000110
.	Pipe, Ceramic White	4855000111

<b>P-2</b>	<b>PCB Ass'y-Fuse</b>	<b>059222900002</b>
<b>Capacitor</b>		
C900	Ceramic 0.0047 $\mu$ F 400V -J	3549472410
<b>Others</b>		
F901 (F901)	Fuse, NB 20 $\times$ 5.1mm 4A 250Vac for Domestic only Fuse, T 20 $\times$ 5.1mm 1.6A/250Vac C,D,E,F only	5508202921 5508302334
F902 (F902) (F902)	Fuse, NB 20 $\times$ 5.1mm 2.5A 250Vac for Domestic only Fuse, NB 20 $\times$ 5.1mm 2.5A 250Vac for B version only Fuse, Not used for A,C,D,E,F only	5508202530 5508202521
P7, P8 P12, P10	Pin Wrapping Pin Wrapping	4425000315 4425000315



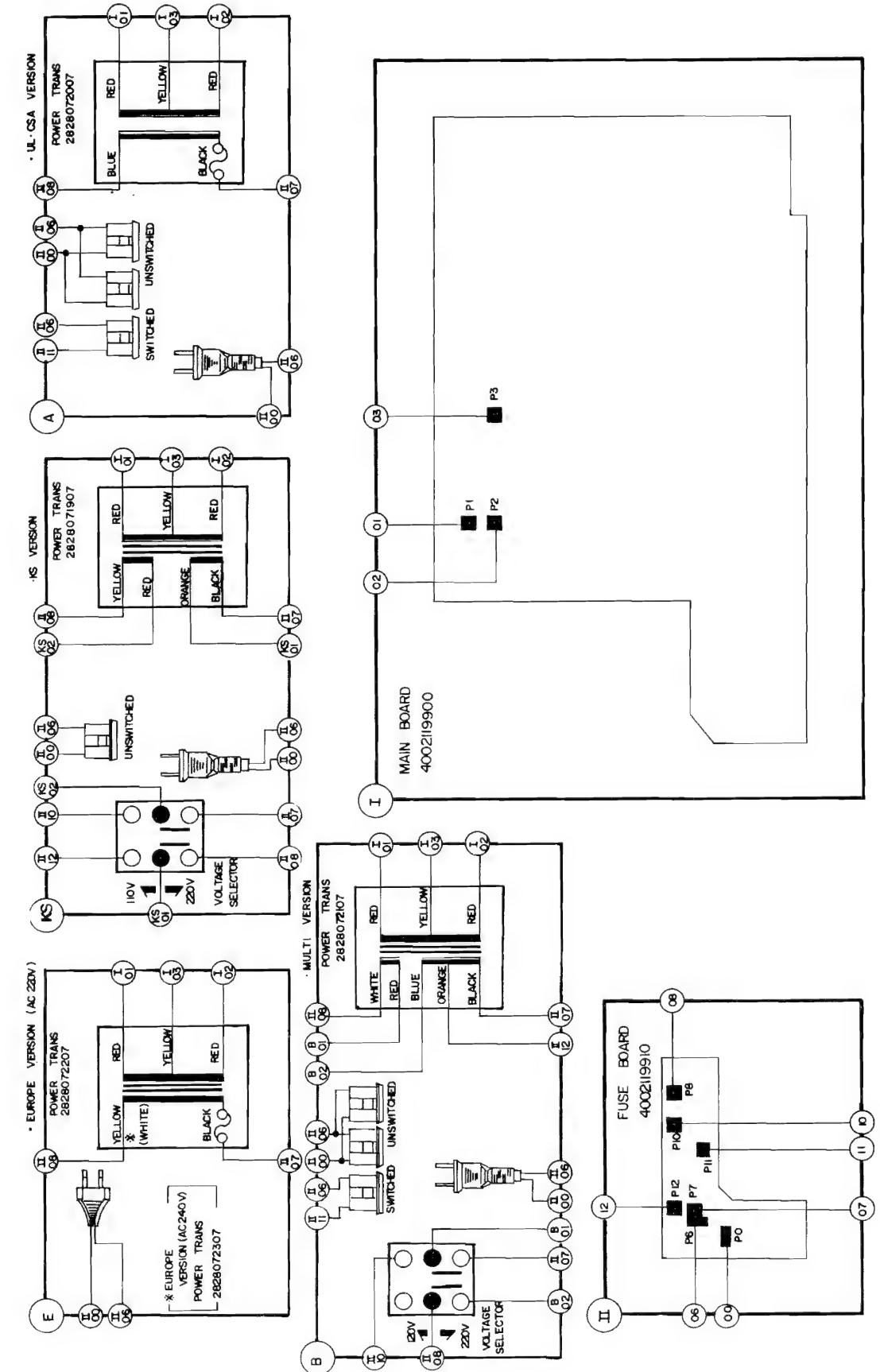
Ref. No.	Description	Mfr. Part No.
• P0, P6	Holder Fuse	4225000415
	Pin, Solder	4225001410
•	Power Transformer for A only	2828072007
•	Power Transformer for B only	2828072107
•	Power Transformer for C,D,F only	2828072207
•	Power Transformer for E only	2828072307
•	Power Transformer for Domestic only	2828071907

## Mechanical Parts List

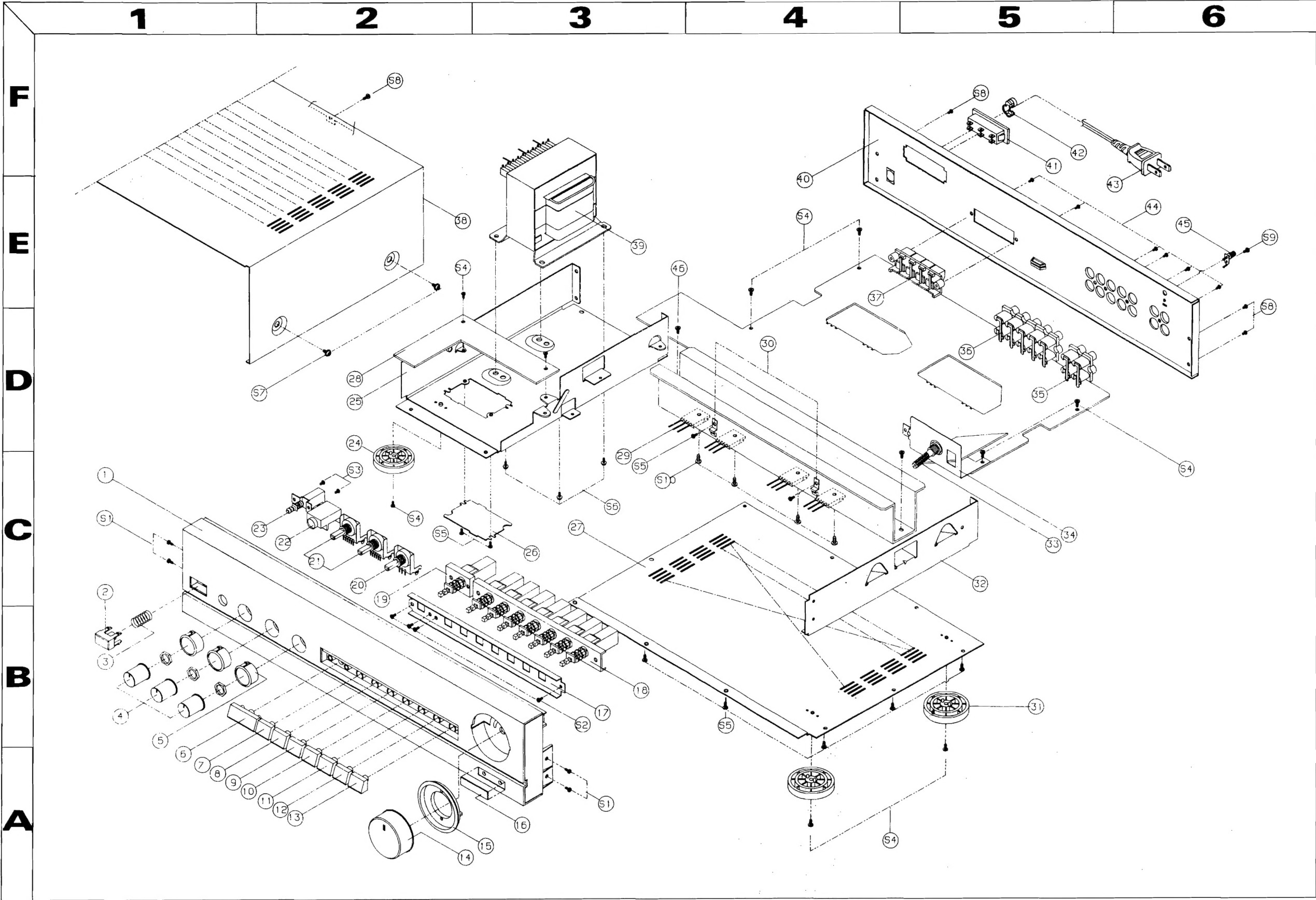
No.	Parts No.	Description	Q'ty	Position	Remark
1	048501014811	Panel Front, Black	1	C1	Domestic
2	048545048211	Knob Push, Power, Black	1	C1	
	8545048210	Knob Push, Power, Black	1	C1	
3	6555004380	Spring, Power	3	B1	
4	8543015810	Knob Rotary, Tone	3	B1	
5	8525007310	Decoration Ring	1	B1	
6	048543023311	Knob Push, Direct	1	A1	
7	048543023411	Knob Push, Tape Monitor	1	A1	
8	048543023412	Knob Push, AUX/DAT	1	A1	
9	048543023413	Knob Push, Video	1	A1	
10	048543023414	Knob Push, Tuner	1	A1	
11	048543023415	Knob Push, CD	1	A2	
12	048543023416	Knob Push, Phono	1	A2	
13	048543023417	Knob Push, Loudness	1	A2	
14	048643003711	Knob Rotary, Main	1	A2	D
	8543019510	Knob Rotary, Main	1	A2	Domestic
15	8523009220	Decoration Ring	1	A3	
16	048535019011	Badge Sherwood	1	A3	
	8535019010	Badge	1	A3	
17	6505095010	Bracket Switch	1	B3	
18	4628055110	Switch Push, 7Key	1	B3	
19	4628050510	Switch Push, 1Key	1	C2	
20	3208054410	VR Rotary, 100KSW	1	C2	
21	3208049910	VR Rotary, 100KC×2	2	C2	
22	4438003810	Phon Jack	1	C2	
23	4628044410	Switch Power, Main	1	C2	Domestic, A B,C,D,E,F
24	046035101511	Foot Gold, Front	2	D2	
	046035101511	Foot Gold	4	D2	
25	6122619810	Frame Side, Left	1	D2	
26	6125402010	Cover Bottom	1	C3	Domestic, A B,C,D,E,F
27	6122414610	Cover Bottom	1	C3	
28	4002119910	Fuse Board, PCB	1	D2	
29	2028106106	Power TR	4	C3	
30	6515002312	Holder Biasing TR	2	D4	
31	6035101510	Foot Base, Black	2	B5	
		Not used I	0	B5	
32	6123011310	Frame Side, Right	1	C5	
33	3208056310	VR Rotary 100KB×2, Main	1	C5	
34	6165135010	Shield Fence, w/Main Volume	1	C5	
35	4438103110	RCA Jack, 4P	2	D5	
36	4438103110	RCA Jack, 6P	1	D5	
37	4408103110	Speaker Terminal	1	E4	
38	046122019511	Top Cover, Black	1	E2	
39	2828072007	Power Transformer	1	E3	
40	046102026421	Chassis Back, Black	1	E4	A

No.	Parts No.	Description	Q'ty	Position	Remark
41	046102026431	Chassis Back, Black	1	E4	B
	046102026441	Chassis Back, Black	1	E4	C
	046102026451	Chassis Back, Black	1	E4	D
	046102026461	Chassis Back, Black	1	E4	E
	046102026471	Chassis Back, Black	1	E4	F
	046102026411	Chassis Back, Black	1	E4	Domestic
	4448100810	AC Outlet, Black	1	F5	A
	4448100410	AC Outlet, Black	1	F5	Domestic
	6513000310	Cord Stopper, Black	1	F5	A,B
	6518000111	Cord Stopper, Black	1	F5	C,D,F
42	6518000710	Cord Stopper, Black	1	F5	Domestic, E
	4308001410	AC Power Cord, Black	1	E6	A,B
	4308001610	AC Power Cord, Black	1	E6	Domestic
	4308000430	AC Power Cord, Black	1	E6	C,D,F
43	4308000610	AC Power Cord, Black	1	E6	E
	4408104910	System Ground	1	E6	
	4002119900	PCB Main	1	E4	
44	7502002710	Heat sink Power	1	E4	
<b>Screws</b>					
S1	8519230061	#2 WPTC 3×6 ZNY			
S2	8109330061	#2 BTC 3×6 ZNY			
S3	8109230081	#2 BTC 3×8 ZNY			
S4	8159230081	#2 WPTC 3×8 ZNY			
S5	8109230061	#2 BTC 3×6 ZNY			
S6	8159440081	WPM 4×8 ZNY			
S7	8159440083	WSAM 4×8 ZNB			
S8	8109230083	#2 BTC 3×8 ZNB			
S9	8119240061	#2 BTC 4×6 ZNY			
S10	8059130121	MEX M3×12 ZNY			

## Wiring Diagram



Exploded View





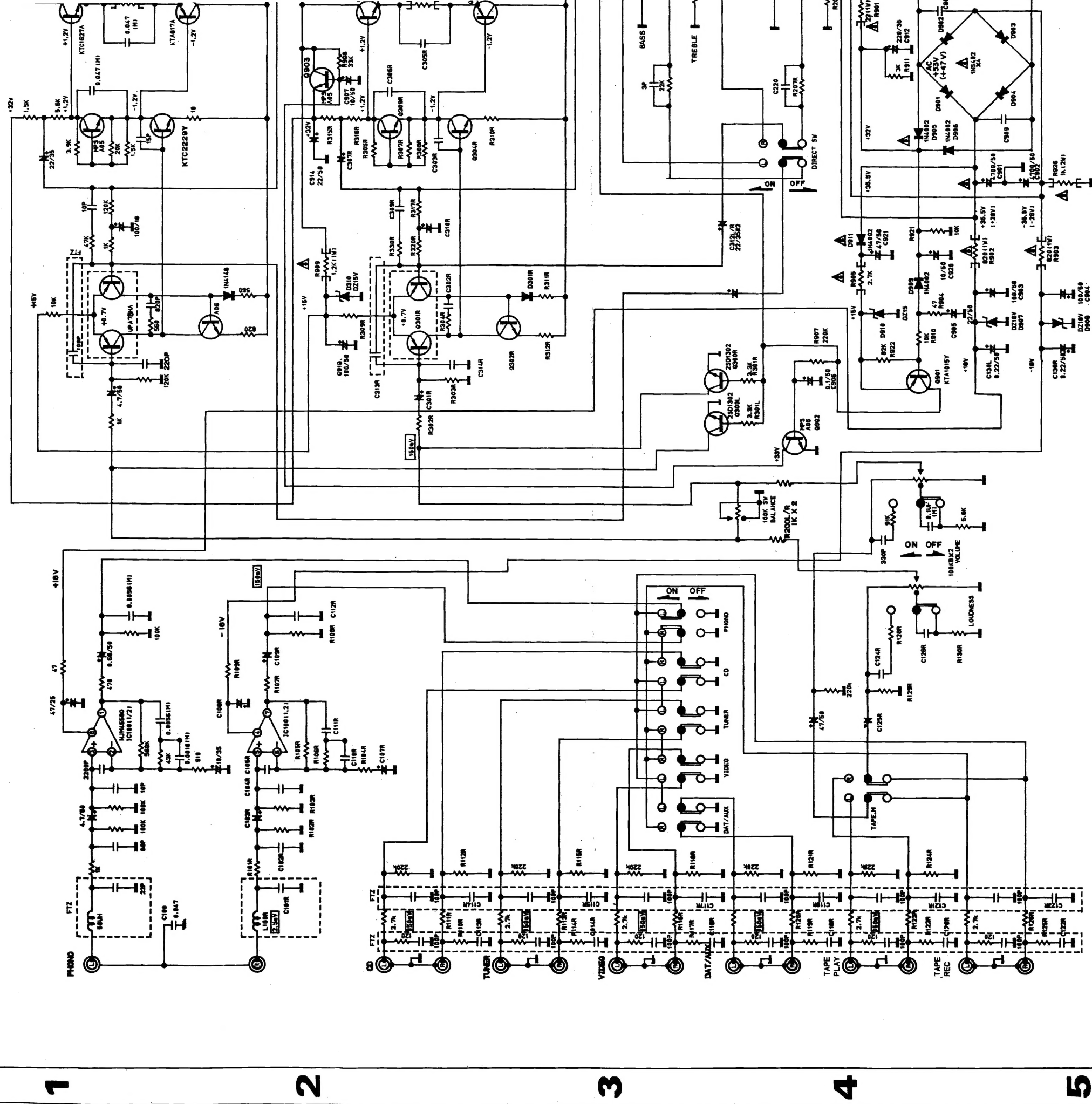


A

B

C

D

Schematic Diagram  
AI-2210

**AI-2210**

